

electronic component or the board and the insulating resin layer, the innate adhesion of the insulating resin is effected. This increases the insulating resin of high adhesion in the bonding interface, allowing the adhesion strength of the electronic component or the board and the insulating resin to be improved and improving the adhesion to the electronic component or the board with the effect of reducing the coefficient of linear expansion by the inorganic filler kept intact. With this arrangement, the operating life is improved during a variety of reliability tests, and the peel strength to bending is improved.

Furthermore, by employing an insulating resin, which improves the adhesion to the film material used on the surface of the electronic component in the portion or layer brought in contact with the electronic component and employing the insulating resin, which improves the adhesion to the material of the board surface, in the portion or layer brought in contact with the board, the adhesion can further be improved.

In each of the aforementioned embodiments, it is acceptable to apply heat from the electronic component side or from the board side or from both the electronic component side and the board side after performing both the process of metallurgically bonding the gold bumps to the board electrodes with supersonic waves applied and the process of

correcting the warp and undulation of the board and crushing the bump without applying heat to both the electronic component and the board.

As described above, according to the present invention, there can be provided the method and apparatus for bonding electronic components to boards with high productivity and high reliability without needing the resin encapsulating process to pour resin between the electronic component and the board and the bump leveling process for regulating the bump height constant after the bonding of the electronic component to the circuit board.

Although the present invention has been fully described in connection with the preferred embodiments thereof with reference to the accompanying drawings, it is to be noted that various changes and modifications are apparent to those skilled in the art. Such changes and modifications are to be understood as included within the scope of the present invention as defined by the appended claims unless they depart therefrom.

CLAIMS

1. An electronic component mounting method comprising:

forming a ball (96, 96a) at a tip of a metal wire (95) by an electric spark similarly to wire bonding and forming a bump (3, 103) by thermocompression-bonding the formed ball to an electrode (2) of an electronic component (1) with supersonic waves by means of a capillary (93, 193);

mounting the electronic component on a circuit board (4) by aligning in position the electrode of the electronic component with an electrode (5) of the board with interposition of an anisotropic conductive layer (10) in which an insulating resin mixed with an inorganic filler is mixed with a conductive particle (10a); and

subsequently bonding the electronic component to the circuit board by hardening the insulating resin of the anisotropic conductive layer interposed between the electronic component and the circuit board while correcting warp of the board and crushing the bump with a pressure force of not smaller than 20 gf per bump applied to the electronic component against the circuit board by means of a tool (8) and heat applied from the electronic component side or heat applied from the board side or heat applied from both the electronic component side and the board side,